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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/922,221	08/02/2001	Glen A. Evans	P-EA 4854	8915

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EXAMINER
CHAKRABARTI, ARUN K

ART UNIT	PAPER NUMBER
1634	9

DATE MAILED: 11/27/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.	Applicant(s)
09/922,221	Evans
Examiner	**Art Unit**
Arun Chakrabarti	1634

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on Aug 2, 2001 .

2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) 1-23 is/are pending in the application.

4a) Of the above, claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) 1-23 is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☐ The drawing(s) filed on _____ is/are a) ☐ accepted or b) ☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13) ☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) ☐ All b) ☐ Some* c) ☐ None of:

1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

*See the attached detailed Office action for a list of the certified copies not received.

14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

a) ☐ The translation of the foreign language provisional application has been received.

15) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s). 3
4) ☐ Interview Summary (PTO-413) Paper No(s). _____
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☒ Other: *Detailed Action*

DETAILED ACTION

Priority

1. Applicant's claim for domestic priority under 35 U.S.C. 119(e) is acknowledged. However, the provisional application (60/059017) upon which priority is claimed fails to provide adequate support under 35 U.S.C. 112 for all pending claims 1-23 of this application. The provisional application (60/059017) does not provide any basis in the specification that supports the instant pending claims. Therefore, priority of this provisional application (60/059017) is not granted. However, applicant has been granted priority of the PCT application PCT/US98/19312.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claim 13 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

4. While applicant may be his or her own lexicographer, a term in a claim may not be given a meaning repugnant to the usual meaning of that term. See In re Hill, 161 F.2d 367, 73 USPQ

482 (CCPA 1947). The term "suffer" in claim 13 is used by the claim to mean "a particular stretch of nucleotides" while the accepted meaning is "effect and manifestation of a disease or illness".

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless -
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

6. Claims 1-11, and 14-17 are rejected under 35 U.S.C. 102 (a) as being anticipated by Sharon (PCT International Publication Number WO 98/38296) (September 3, 1998).

Sharon teaches a method of assembling a double-stranded polynucleotide (Abstract, Figure 1) comprising the steps of:

a) selecting a partially double-stranded initiating oligonucleotide, wherein the initiating oligonucleotide comprises a at least one overhang (Abstract, Figure 1);

b) contacting the partially double-stranded initiating oligonucleotide with a next most terminal double-stranded oligonucleotide, wherein the next most terminal double-stranded initiating oligonucleotide is contiguous with the initiating oligonucleotide and comprises at least one overhang, and wherein at least one overhang of the next most terminal double-stranded

oligonucleotide is complementary to at least one overhang of the initiating oligonucleotide (Abstract, Figure 1, and Page 18, fourth paragraph to Page 19, first paragraph);

c) repeating step (b) to sequentially add the next most terminal double-stranded oligonucleotide to the extended initiating oligonucleotide, whereby the double-stranded oligonucleotide is synthesized (Abstract, Figure 1).

Sharon teaches a method wherein the initiating and next most terminal oligonucleotide in have a 3' and a 5' overhang (Figure 1)

Sharon teaches a method of providing a target polynucleotide sequence, identifying at least one partially double-stranded initiating oligonucleotide with 5' and 3' overhang, and identifying a next most terminal double-stranded oligonucleotide with 5' and 3' overhang, and contacting the partially double-stranded initiating oligonucleotide with next most terminal double-stranded initiating oligonucleotide and annealing them, and repeating the steps to synthesize a target polynucleotide (Figure 1 and Page 8, third paragraph to page 9, line 14 and page 10, third paragraph and page 12, last paragraph).

Sharon teaches a method wherein the initiating oligonucleotide is extended in a uni and bi-directional manner (Figure 1).

Sharon teaches a method, wherein the initiating oligonucleotide is the 5' and 3' most terminal oligonucleotide of the target polypeptide, which is an enzyme protein (Claims 18-19).

Sharon teaches a method, wherein the complementary overhang of the next most terminal double-stranded oligonucleotide comprises about fifty percent of the length of the strand having the complementary overhang (Figure 1).

Sharon teaches a method, wherein the strand having the complementary overhang is about 15 to 1000 nucleotides in length (Figure 2 and page 30).

7. A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 1-11, 14-21 and 23 are rejected under 35 U.S.C. 102(b) over Beattie et al., (Biotechnology and Applied Biochemistry, (1988), Vol. 10, pages 510-521).

Beattie et al. teaches a method of assembling a double-stranded polynucleotide (Figure 6 and 8) comprising the steps of:

a) selecting a partially double-stranded initiating oligonucleotide, wherein the initiating oligonucleotide comprises a at least one overhang (Figure 8);

b) contacting the partially double-stranded initiating oligonucleotide with a next most terminal double-stranded oligonucleotide, wherein the next most terminal double-stranded initiating oligonucleotide is contiguous with the initiating oligonucleotide and comprises at least one overhang, and wherein at least one overhang of the next most terminal double-stranded oligonucleotide is complementary to at least one overhang of the initiating oligonucleotide (Figures 6 and 8 and Pages 514-518, Progress in Gene Synthesis and Assembly Section));

c) repeating step (b) to sequentially add the next most terminal double-stranded oligonucleotide to the extended initiating oligonucleotide, whereby the double-stranded oligonucleotide is synthesized (Figure 6).

Beattie et al. teaches a method wherein the initiating and next most terminal oligonucleotide have a 3' and a 5' overhang (Figure 8)

Beattie et al. teaches a method of providing a target polynucleotide sequence, identifying at least one partially double-stranded initiating oligonucleotide with 5' and 3' overhang, and identifying a next most terminal double-stranded oligonucleotide with 5' and 3' overhang, and contacting the partially double-stranded initiating oligonucleotide with next most terminal double-stranded initiating oligonucleotide and annealing them, and repeating the steps to synthesize a target polynucleotide (Pages 514-518, Progress in Gene Synthesis and Assembly Section and Figures 6 and 8).

Beattie et al. teaches a method wherein the initiating oligonucleotide is extended in a uni and bi-directional manner (Figures 6 and 8).

Beattie et al. teaches a method, wherein the initiating oligonucleotide is the 5' and 3' most terminal oligonucleotide of the target polypeptide, which is an enzyme protein (Pages 514-518, Progress in Gene Synthesis and Assembly Section).

Beattie et al. teaches a method, wherein the complementary overhang of the next most terminal double-stranded oligonucleotide comprises about fifty percent of the length of the strand

having the complementary overhang (Figure 8 and Pages 514-518, Progress in Gene Synthesis and Assembly Section)).

Beattie et al. teaches a method, wherein the strand having the complementary overhang is about 15 to 1000 nucleotides in length (Figures 6-7).

Beattie et al. teaches a method, wherein the initiating oligonucleotide is attached to a solid support (Figures 6 and 7).

Beattie et al. teach a method of assembling a double-stranded polynucleotide (Figure 6 and 7), comprising:

a) chemically synthesizing a first set of oligonucleotides of at least 25 bases comprising a first strand of double-stranded polynucleotide (Pages 514-518, Progress in Gene Synthesis and Assembly Section) ;

b) chemically synthesizing a second set of oligonucleotides of at least 25 bases comprising a second complementary strand of double-stranded polynucleotide , each of the oligonucleotides within the second set of the oligonucleotides overlapping with at least one oligonucleotide within the first set of the oligonucleotides (Figure 9); and

c) annealing the first and second sets of oligonucleotides to produce a replication-competent double-stranded polynucleotide in the absence of enzymatic synthesis or polymerization (Figure 6 and Pages 514-518, Progress in Gene Synthesis and Assembly Section).

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

10. Claims 12-13 are rejected under 35 U.S.C. 103 (a) over Beattie et al., (Biotechnology and Applied Biochemistry, (1988), Vol. 10, pages 510-521) in view of Wallis (U.S. Patent 6,287,807 B1) (September 11, 2001).

Beattie et al., teaches the method of claims 1-11, 14-21 and 23 as described above.

Beattie et al., does not teach the method wherein the initiating oligonucleotide comprises a sequence identified by a computer program.

Wallis teaches the method wherein the initiating oligonucleotide comprises a sequence identified by a computer program (Column 32, lines 61-67 and Column 33, line 14 to Column 34, line 14).

It would have been *prima facie* obvious to one having ordinary skill in the art at the time the invention was made to combine and substitute the method wherein the initiating oligonucleotide comprises a sequence identified by a computer program of Wallis in the method of Beattie et al., since Wallis states, "A computer based method is provided for performing

homology identification (Column 32, lines 61-62)". An ordinary practitioner would have been motivated to combine and substitute the method wherein the initiating oligonucleotide comprises a sequence identified by a computer program of Wallis in the method of Sharon in order to achieve the express advantages noted by Wallis of a computer based method that is provided for performing homology identification.

Beattie et al. in view of Wallis obviously teach an algorithm but do not teach the particular algorithm of claim 13.

However, it is *prima facie* obvious that selection of a specific algorithm to identify a nucleotide sequence represents routine optimization with regard to sequence, length and compositions, which routine optimization parameters are explicitly recognized to an ordinary practitioner in the relevant art. As noted *In re Aller*, 105 USPQ 233 at 235,

> More particularly, where the general conditions
> of a claim are disclosed in the prior art, it is
> not inventive to discover the optimum or workable
> ranges by routine experimentation.

Routine optimization is not considered inventive and no evidence has been presented that the algorithm selection performed was other than routine, that the products resulting from the optimization have any unexpected properties, or that the results should be considered unexpected in any way as compared to the closest prior art.

11. Claim 22 is rejected under 35 U.S.C. 103 (a) over Beattie et al., (Biotechnology and Applied Biochemistry, (1988) further in view of Wagner, Jr. (U.S. Patent 6,120,992) (September 19, 2000).

Beattie et al., teaches the method of claims 1-11, 14-21, and 23 as described above.

Beattie et al., does not teach the method wherein the method of assembling a double-stranded polynucleotide is carried out by annealing in the presence of MutS protein.

Wagner, Jr. teaches the method wherein the method of assembling a double-stranded polynucleotide is carried out by annealing in the presence of MutS protein (Abstract and Column 4, lines 35-54 and Examples II-XIII).

It would have been *prima facie* obvious to one having ordinary skill in the art at the time the invention was made to combine and substitute the method wherein the method of assembling a double-stranded polynucleotide is carried out by annealing in the presence of MutS protein of Wagner, Jr. in the method of Beattie et al., since Wagner, Jr. states, "A method for detecting mutations, such as single base change or an addition or deletion of about one to four base pairs, is based on the use of an immobilized DNA mismatch binding protein, such as MutS, which binds to a nucleic acid hybrid having a single base mismatch or unpaired base, or bases, thereby allowing the detection of mutations involving as little as one base change in a nucleotide sequence (Abstract, first sentence)". An ordinary practitioner would have been motivated to combine and substitute the method wherein the method of assembling a double-stranded polynucleotide is carried out by annealing in the presence of MutS protein of Wagner, Jr. in the

method of Beattie et al., in order to achieve the express advantages noted by Wagner, Jr. of the use of an immobilized DNA mismatch binding protein, such as MutS, which binds to a nucleic acid hybrid having a single base mismatch or unpaired base, or bases, thereby allowing the detection of mutations involving as little as one base change in a nucleotide sequence.

Conclusion

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Arun Chakrabarti, Ph.D., whose telephone number is (703) 306-5818. The examiner can normally be reached on 7:00 AM-4:30 PM from Monday to Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gary Jones, can be reached on (703) 308-1152. The fax phone number for this Group is (703) 746-4979.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group analyst Chantae Dessau whose telephone number is (703) 605-1237.

Arun Chakrabarti,

Patent Examiner,

September 12, 2002

W. Gary Jones
Supervisory Patent Examiner
Technology Center 1600